



Application of ocean color remote sensing to water quality standards development and marine spatial planning

John Lehrter, EPA, Gulf Breeze, Florida

NASA Water Resources Program Review and Meeting
NASA Ames Research Center, Moffett Field, California
September 5-6, 2012



NASA Decision Support Grant NNH08ZDA001N-DECISIONS

EPA ORD

John Lehrter

Blake Schaeffer

Robyn Conmy

Jim Hagy

William Fisher

NASA SSC

Bruce Spiering

Lauren Underwood

NOAA CSC

Chris Ellis

USF

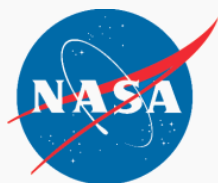
Brian Barnes

Chuanmin Hu

FWRI

Luke McEachron

Kathleen O'Kiefe



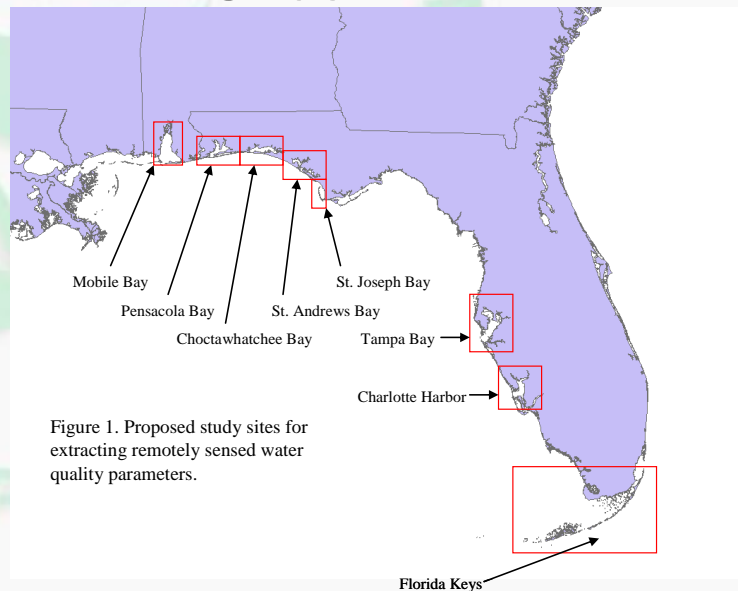
Goal: Develop retrospective time-series (mid-1980s to the present) of light attenuation and determine contributions of phytoplankton, suspended sediment, and dissolved organic matter to light attenuation

Decision Support: Work with partners within EPA and the FKNMS to utilize remote sensing products for decision support

MODIS



Sites



Landsat

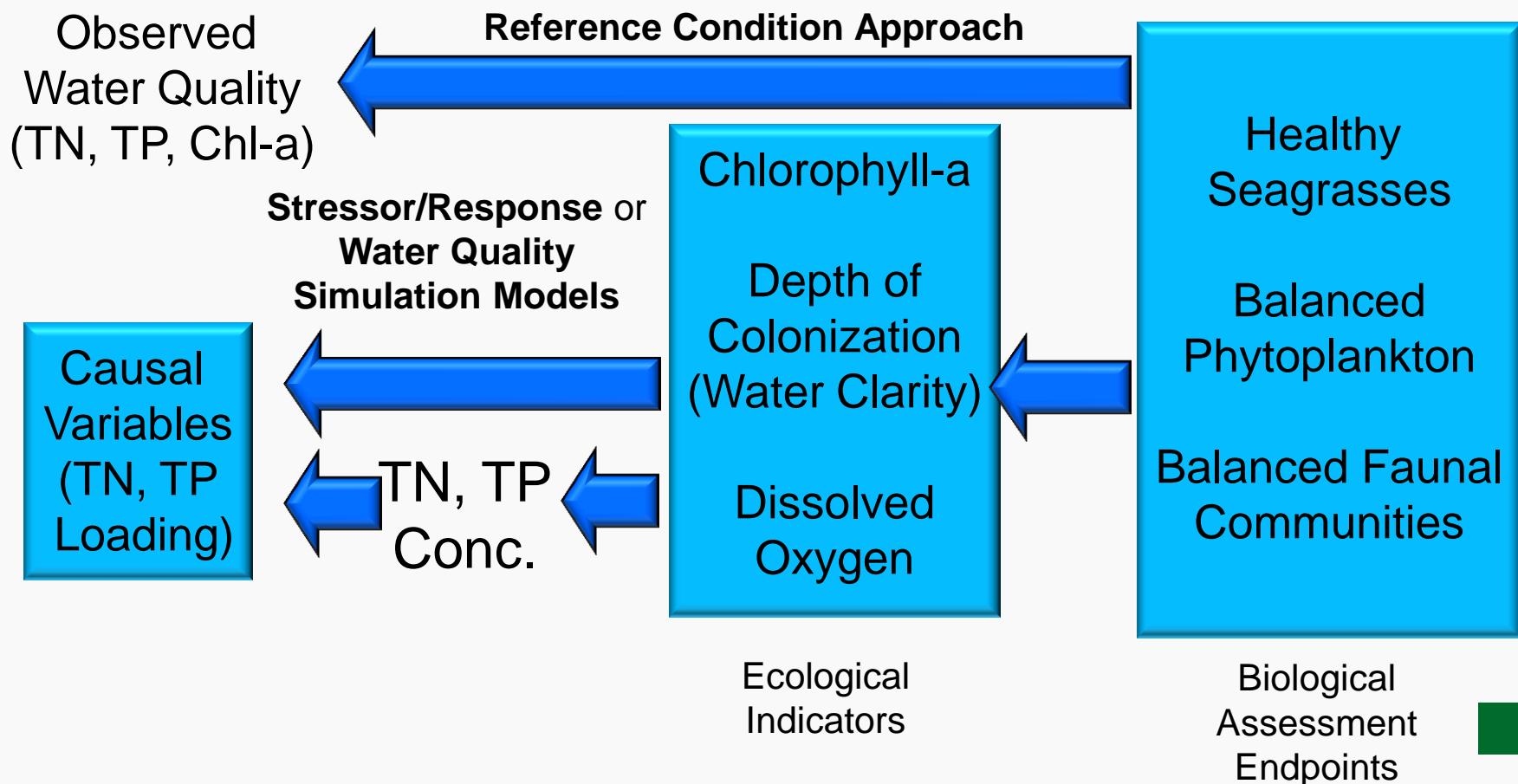




Two Decision Landscapes

1. The Clean Water Act provides for the use of water quality standards to protect the physical, chemical, and biological integrity of the nation's water resources
 - CWA Section 303 - development of numeric water quality standards
 - FDEP Chapter 62-302, Florida Administrative Code (FAC) and in the Impaired Waters Rule (IWR, Chapter 62-303, FAC)
 - Decision-making entities
 - EPA Office of Water
 - Gulf States (Gulf of Mexico Alliance)
2. Marine Spatial Planning
 - Rezoning of the Florida Keys National Marine Sanctuary
 - Decision-making entity
 - FKNMS

Criteria Development Approaches



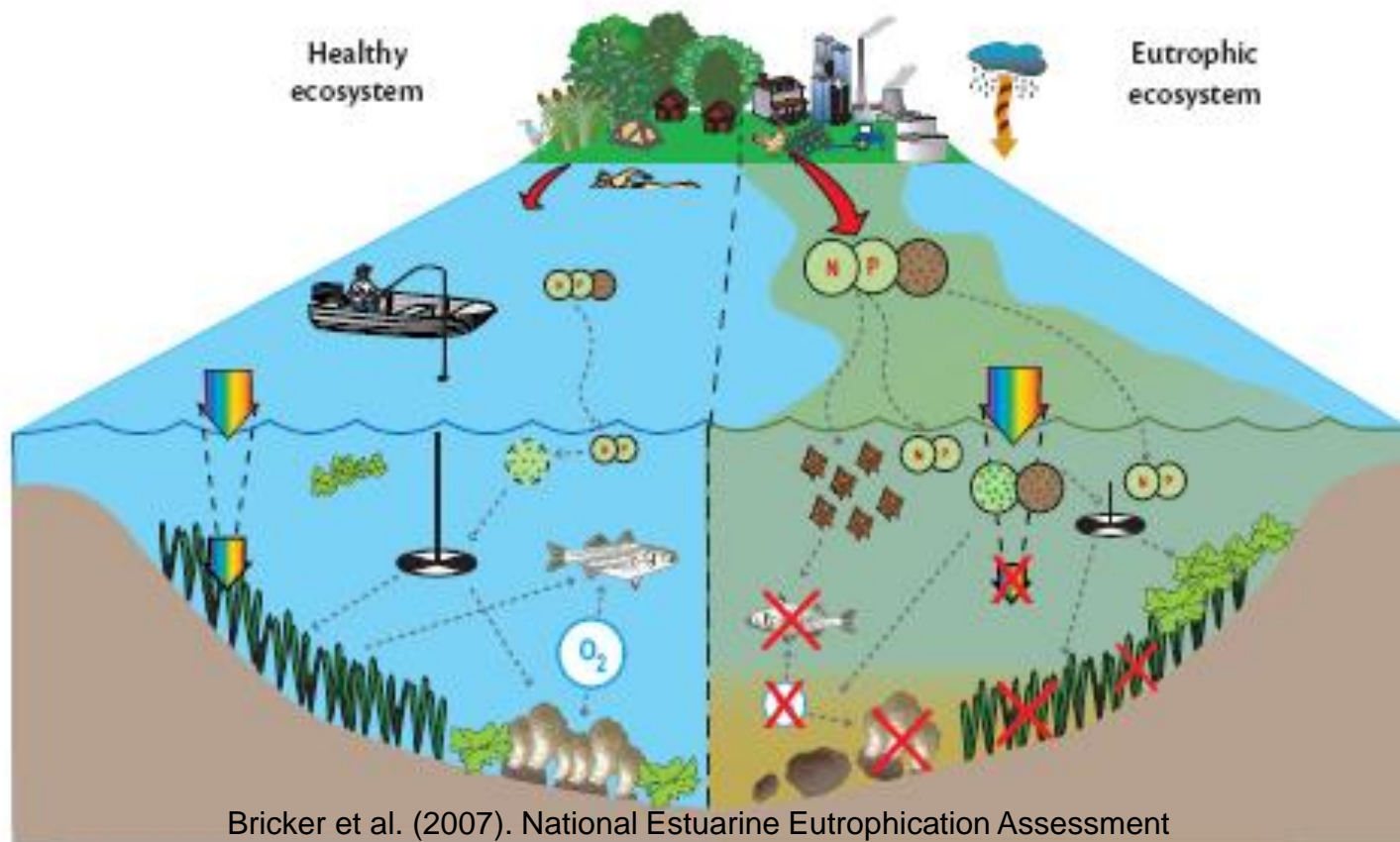


Needs Assessment

Nutrient Criteria Development: Survey of GOMA States

- Methods for analysis and development of nutrient criteria
 - Reference condition approach
 - Mechanistic stressor-response relationship approach
- Methods for analysis of response/endpoint variables (e.g. seagrass and coral)
- Methods development for remote sensing data

How can NASA remote sensing imagery be used to assist these decisions?

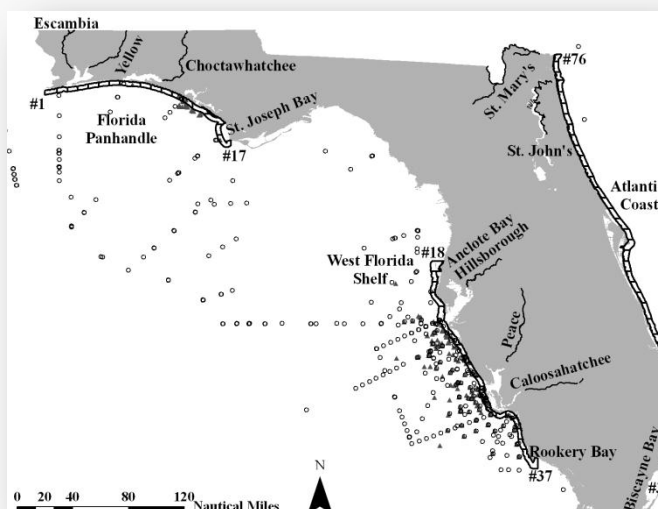


9 January 2009

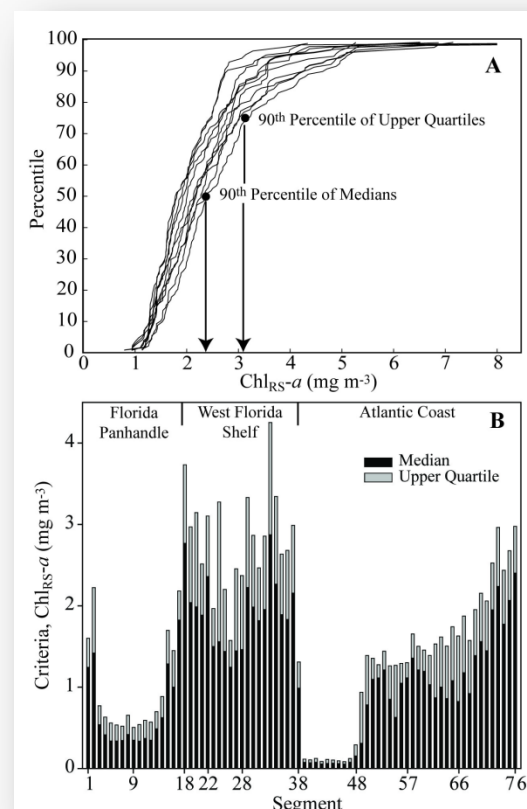
Aqua MODIS



Numeric Nutrient Criteria Development in Florida



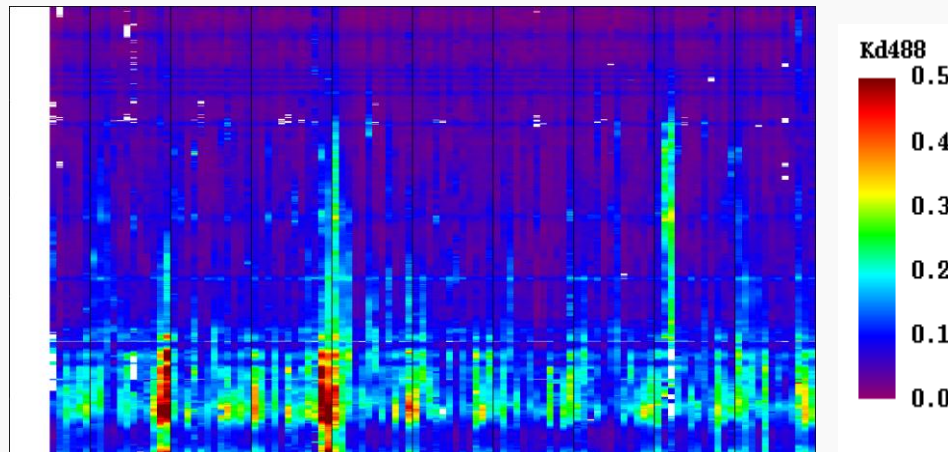
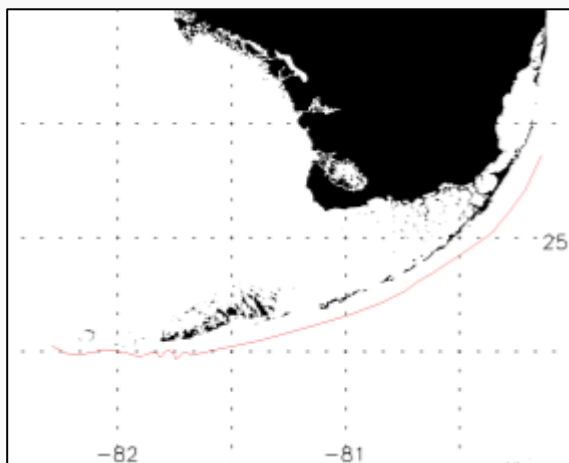
Schaeffer et al. Environmental Science & Technology.
2012 (46) 916-922



- Reviewed by the EPA Science Advisory Board and Adopted by the EPA OW

Rezoning of the Florida Keys National Marine Sanctuary

Water Clarity Mapping along the Reef Tract



Barnes et al. in review

For example, the FKNMS may decide to afford higher protection to regions with the greatest water clarity to protect corals and seagrasses and to provide recreational enjoyment



FY2013 Activities

- Define remote sensing methodologies and processing steps for transitioning to decision-making entities
- Quantify enhancements in decision-making activities
 - Economic valuation of enhancements
- Identify issues with transitioning to new NASA platforms
 - VIIRS
 - PACE (2019)
- Final Report and manuscripts